[0113] The image sensor of FIG. **15** is substantially the same as the image sensor of FIG. **12**, except for the arrangement of first color separation elements **131**. Referring to FIG. **15**, two adjacent first color separation elements **131** may be positioned with respect to each other at an angle of 90 degrees. For example, first color separation elements **131** arranged in a vertical direction and first color separation elements **131** arranged in a horizontal direction may be alternately arranged in a first pixel row P**1**. Also, first color separation elements **131** arranged in the horizontal direction and first color separation elements **131** arranged in the vertical direction may be alternately arranged in a second pixel row P**2**.

[0114] In this case, the first color separation elements **131** arranged in the vertical direction in the first pixel row P**1** may provide light C**1**+C**3**, which is a mixture of lights having first and third wavelength bands, to first pixels **110***a* arranged in the first pixel row P**1**. The first color separation elements **131** arranged in the horizontal direction in the first pixel row P**1** may provide the light C**1**+C**3**, which is the mixture of the lights having the first and third wavelength bands, to third pixels **110***c* arranged in another pixel row (e.g., the second pixel row P**2**). The first color separation elements **131** arranged in the vertical direction in the second pixel row P**2** may provide the light C**1**+C**3**, which is the mixture of the lights having the first and third wavelength bands, to the third pixels **110***c* arranged in the second pixel row P**2**. The first color separation elements **131** arranged in the horizontal direction in the second pixel row P**2** may provide the light C**1**+C**3**, which is the mixture of the lights having the first and third wavelength bands, to first pixels **110***a* arranged in another pixel row (e.g., the first pixel row P**1** or a third pixel row P**3**).

[0115] FIG. **16** is a schematic plan view of a structure of pixels of an image sensor according to still another exemplary embodiment.

[0116] The image sensor of FIG. **16** is substantially the same as the image sensor of FIG. **12**, except for the arrangement of first color separation elements **131**. Referring to FIG. **16**, the first color separation elements **131** may extend (or may be oriented) in a first diagonal direction (e.g., from a top left to a bottom right) of the pixel array. Thus, the first color separation elements **131** may be arranged to cross a plurality of second pixels **110***b* in the first diagonal direction. In this case, the first color separation elements **131** may provide light C**1**+C**3** which is a mixture having lights of first and third wavelength bands to first pixels **110***a* and third pixels **110***c*. Although FIG. **16** illustrates that the first color separation elements **131** extend in the first diagonal direction, the first color separation elements **131** may extend in a second diagonal direction (e.g., from a top right to a bottom left) intersecting the first diagonal direction.

[0117] FIG. **17** is a schematic plan view of a structure of pixels of an image sensor according to still another exemplary embodiment.

[0118] In the image sensor of FIG. **17**, first color separation elements **131** may extend in both a first diagonal direction and a second diagonal direction. For example, each of the first color separation elements **131** may include a first sub-color separation element **131***a* that extends in the first diagonal direction (e.g., from a top left to bottom right) and a second sub-color separation element **131***b* that extends in the second diagonal direction (e.g., from a top right to a bottom left).

[0119] FIG. **18** illustrates an arrangement of four 2×2 patterns according to the embodiment of FIG. **6**.

[0120] Each of the four 2×2 patterns illustrated in FIG. **18** is substantially the same as the 2×2 pattern according to the embodiment of FIG. **6**. As illustrated in FIG. **18**, a second color separation element **132** may be arranged on each of a plurality of first pixels **110***a* and a plurality of third pixels **110***c*. A first color filter **121** may be arranged only on each of the plurality of first pixels **110***a* and not arranged in the other pixels.

[0121] FIG. **19** is a schematic plan view of a structure of pixels of an image sensor according to still another exemplary embodiment.

[0122] The image sensor of FIG. **19** is substantially the same as the image sensor of FIG. **18**, except for the arrangement of second color separation elements **132**. Referring to FIG. **19**, two adjacent second color separation elements **132** may be positioned with respect to each other at an angle of about 90 degrees. For example, second color separation elements **132** arranged in a vertical direction and second color separation elements **132** arranged in a horizontal direction may be alternately arranged in a first pixel row P**1**. Also, second color separation elements **132** arranged in the horizontal direction and second color separation elements **132** arranged in the vertical direction may be alternately arranged in a second pixel row P**2**. In this case, the second color separation elements **132** arranged in the vertical direction may provide light C**2** having a second wavelength band to second pixels **110***b* arranged in the pixel rows in which the second color separation elements **132** are arranged. The second color separation elements **132** arranged in the horizontal direction may provide the light C**2** of the second wavelength band to the second pixels **110***b* arranged in pixel rows in which the second color separation elements **132** are not arranged.

[0123] FIG. **20** is a schematic plan view of a structure of pixels of an image sensor according to still another exemplary embodiment.

[0124] The image sensor of FIG. **20** is substantially the same as the image sensor of FIG. **18**, except for the arrangement of second color separation elements **132**. Referring to FIG. **20**, the second color separation elements **132** may extend in a first diagonal direction. Thus, the second color separation elements **132** may be arranged to cross a plurality of first pixels **110***a* and a plurality of third pixels **110***c* in the first diagonal direction. Although FIG. **20** illustrates that the second color separation elements **132** extend in the first diagonal direction, the second color separation elements **132** may extend in a second diagonal direction intersecting the first diagonal direction.

[0125] FIG. **21** is a schematic plan view of a structure of pixels of an image sensor according to still another exemplary embodiment.

[0126] In the image sensor of FIG. **21**, second color separation elements **132** may extend in both a first diagonal direction and a second diagonal direction. For example, each of the second color separation elements **132** may include a first sub-color separation element **132***a* that extends in the first diagonal direction and a second sub-color separation element **132***b* that extends in the second diagonal direction.

[0127] FIG. **22** illustrates an arrangement of four 2×2 patterns according to the embodiment of FIG. **10**.

[0128] Each of the 2×2 patterns illustrated in FIG. **22** is substantially the same as the 2×2 pattern according to the